TRUVALUE LABS
A **FACTSET** Company

Truvalue Labs™ Methodology
Core Product

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Executive Summary

Truvalue Labs is the first company to apply artificial intelligence (AI) to uncover timely Environmental, Social, and Governance (ESG) data. The products deliver timely and investable insights by revealing intangible value and risk factors.

The process begins with the capture of unstructured data from tens of thousands of sources around the web each day. Those events are reported by reputable sources with a variety of perspectives. Truvalue Labs' algorithms identify ESG issues, quantify sentiment in the language, and then produce a suite of data and analytics including scores, trend charts, and source material for deep dive research.

How We're Different

As ESG integration spreads across the industry, hurdles remain. Chief among them: Today the majority of ESG data is derived from company-provided materials.

That's an *inside-out* perspective on ESG: seeing what companies choose to disclose. What Truvalue Labs does is different—an *outside-in* perspective we call ESG2.0™. Our platform mines semantic big data, capturing the views of analysts, advocacy groups, and government regulators, all as published by independent media.

Today's big data opportunity is an unending flow of online information that is a challenge for any analyst to parse through in a timely fashion. Now analysts and managers can have a curated, powerful dataset at their fingertips for in-depth research, screening, and quantitative investing strategies.

Data on the Platform

Millions of data points
"Big Data" is a popular buzzword, but is increasingly being used to describe whatever data is being sold to a client. True Big Data is both vast and ever-growing, which makes it impractical for analysts to handle without technology. With the right technology to assist humans, Big Data opens doors.

100,000+ sources
Truvalue Labs taps into an ocean of real-time big data to produce ESG scores and analytics. More than 1 million signals per month are gleaned from 100,000+ sources around the web. Coverage includes major ETF benchmarks such as the S&P 500 (SPX), Russell 1000 (RUI) and 3000 (RUA), MSCI World (URTH), FTSE 100 (UKX), and Dow Jones (DJI).

Our curated sources are vetted by a content and data team of ESG expert analysts and researchers, who follow a rigorous process to deliver you the most relevant ESG view of companies' ESG performance with an external, or outside, perspective.

This means that we help complete your company ESG view with information that you can't find on a financial terminal, including information from industry-specific publications, non-company reported regulatory filings, news reports, government agency studies, trade blogs, ESG thought leader-shared Twitter articles, and reports from watchdog groups and NGO organizations. To illustrate this further, a few examples of industry-specific sources include: Automotive News, CleanTechnica, Pharma Live, Solar Industry, Hydrocarbon, and Fierce Telecom.

19,000+ public and private companies
Universe of public companies spans international borders and includes companies of all sizes. Companies can be added to portfolios on the Truvalue Labs platform and weighted for holding size.

International coverage by region
- North America   9,117
- Developed Europe   3,618
- Japan   1,744
- Developed Asia ex-Japan   1,850
- Emerging Markets, Emerging Asia   2,562
- Emerging Markets, Emerging EMEA   682
- Emerging Markets, Latin America   366

Solutions for the Investment Industry

Truvalue Labs augments investment strategies that include financial analysis and a variety of valuation methods, and can be used as a standalone tool for screening, in-depth research, and quantitative strategies:

Asset Managers
- Make data-driven decisions considering intangible risks and value.
- Build custom ESG scores around specified factors.
- Leverage tools that support any strategy, whether fundamental, active, smart beta, or quantitative.
- Identify companies with improving or declining ESG performance trends with ESG Momentum scores.

Asset Owners
- Monitor internal and external manager performance based on ESG criteria that you define.
- Stay on top of events for active shareholder engagement.
- PDF reports provide a capsule view of a company's performance trend versus peers in various categories.
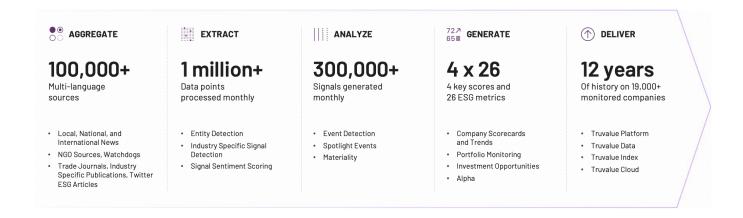
Research Analysts
- Find material ESG information with AI technology.
- Sort companies by score or ranking in a combination of categories to identify ESG outperformers and underperformers.
- Set alerts so you don't miss breaking ESG events.

How Truvalue Labs' Technology Works

The artificial intelligence technology behind Truvalue Labs augments human decision making by extracting meaningful sustainability signals from large volumes of unstructured data. Truvalue Labs supports on-demand analytics and provides instant access to underlying data.

AGGREGATE	EXTRACT	ANALYZE	GENERATE	DELIVER
100,000+	**1 million+**	**300,000+**	**4 x 26**	**12 years**
Multi-language sources	Data points processed monthly	Signals generated monthly	4 key scores and 26 ESG metrics	Of history on 19,000+ monitored companies
• Local, National, and International News • NGO Sources, Watchdogs • Trade Journals, Industry Specific Publications, Twitter ESG Articles	• Entity Detection • Industry Specific Signal Detection • Signal Sentiment Scoring	• Event Detection • Spotlight Events • Materiality	• Company Scorecards and Trends • Portfolio Monitoring • Investment Opportunities • Alpha	• Truvalue Platform • Truvalue Data • Truvalue Index • Truvalue Cloud

Step 1. Collects unstructured data from more than 100,000 sources

Truvalue Labs aggregates a variety of data sources into a continuous stream of relevant ESG data for monitored companies and sectors. The scalable nature of the technology behind our product allows effectively limitless expansion of sources. Truvalue Labs evaluates both semantic and quantitative content, and its flexible architecture lets subscribers incorporate their own proprietary data sources. Language coverage includes Chinese, Danish, Dutch, English, Finnish, French, German, Italian, Japanese, Norwegian, Portuguese, Spanish, and Swedish. Chinese sources are only used for Chinese company coverage, not companies based outside of China.

Step 2. Extracts relevant metrics

Truvalue Labs first sorts content flows by data type, then establishes the context around each data point to extract and categorize sustainability content. Items are tagged to multiple categories if a particular data point has relevance to each. Truvalue Labs sorts data into different frameworks, or "lenses," such as the UN Sustainable Development Goals (SDGs), and the categories defined by the Sustainability Accounting Standards Board™ (SASB™).

Step 3. Normalizes data and generates sustainability performance analytics

All monitored companies have dynamic scorecards that display trends. Data points are factored into a company's scores. For corporate entities that are children of parent companies, data exists independently for the child and also rolls up to the level of the parent company, contributing to its scores. Each data point is weighted according to its timeliness and intensity in scoring formulas that reveal short-term and long-term performance.

Corporate actions are recorded so that data is attributed to companies on a point-in-time basis: Before Amazon acquired Whole Foods, Whole Foods data was its alone. Afterwards, the data rolled up to the acquirer, becoming part of Amazon's data.

Result: Truvalue Labs data and analytics solutions support decision-making

Truvalue Labs offers powerful tools that help investment professionals:

▸ Screen for portfolio construction with comparisons of companies, sectors, and benchmarks
▸ Monitor company ESG performance with customizable alerts system to flag significant changes
▸ Report on companies with research view of underlying data

Types of Truvalue Labs Scores

What makes Truvalue Labs' scores unique?

▸ The **Insight Score** is a measure of a company's longer-term track record, similar to a ratings system. Scores are less sensitive to daily events and reflect the enduring performance record of a company over time. Scores are derived using an exponentially-weighted moving average of the Pulse, defined below, and the half-life of an event's influence on the overall score is 6 months.

▸ The **Pulse Score** is a measure of near-term performance changes that highlights opportunities and controversies, enabling real-time monitoring of companies. It focuses on events of the day and provides a responsive signal to alert investors to dynamic moves.

▸ The **Momentum Score** measures the trend of a company's Insight score. It is a unique metric in the industry that gives investors a high-precision view of the trajectory of a company's ESG or SDG performance, relative to peers. It does so by precisely articulating upward or downward movement, relative to that of all others in the universe, making it a measure that enhances quantitative workflows.

▸ The **Volume Score** measures the information flow or number of articles about a company over the past 12 months. Within Truvalue Platform™ we represent company volume as one of the following: High, Medium, Low, or No Data. This score is displayed using an intuitive three-bar scale. Each company's volume score can be found on the Company, Portfolio, Industry and Sector views. We also provide our Truvalue Data™ services clients direct access to volume counts over a trailing twelve months period of time.

▸ The **Dynamic Materiality™** value reveals the specific categories that drive a company's overall score. Higher Dynamic Materiality values indicates higher volume of articles related to specific categories.

Category Scores and Aggregate Scores

Category scores are derived from all scores a company receives in that category.

Aggregate scores like the SASB All Category and SASB Materiality scores are produced using a weighted average of individual category scores, where the weight utilized is the category score volume.

All of the scores use the same underlying data and 100-point scale

The cognitive computing system behind Truvalue Labs uses natural language processing to interpret semantic content and generate analytics. It does so by applying criteria that are consistent with established sustainability and ESG frameworks, scoring data points on performance using a 0 to 100 scale. A score of 50 represents a neutral impact. Scores above 50 indicate positive performance, and scores below reflect negative performance.

Truvalue Labs recognizes corporate entities within unstructured text, identifies which categories are relevant, and calculates the direction and magnitude for the category and entity.

In addition to the six scores above, two additional scores measure the information flow about a company or category and the impact thereof.

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